

The Protective Value of Hardiness on Military Posttraumatic Stress Symptoms

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This study examined the protective effects of hardiness (dispositional resilience) on self-reported posttraumatic stress disorder (PTSD) symptoms in a sample of postdeployed service members. Hardiness was negatively related to PTSD symptoms. Time in the military, number of deployments, and total time spent on deployment were all positively related to PTSD symptoms. Hardiness moderated the effects of time in the military on PTSD symptoms, such that time in the military had no effect on those who were high in hardiness. Hardiness did not moderate the effects of either deployment measure. Suggestions to modify current military resilience training programs to most effectively enhance the benefits of hardiness are discussed.

Keywords: posttraumatic stress disorder, dispositional resilience, hardiness, military

After over a decade of war in Iraq and Afghanistan, the U.S. military is now challenged with how best to support the large numbers of veterans who have returned from a war zone with lasting psychological health effects, such as posttraumatic stress symptoms, depression, and anxiety (Hoge et al., 2004). Few studies have attempted to identify factors that protect most soldiers from developing these symptoms (Pietrzak, Johnston, Goldstein, Malley, & Southwick, 2009). Finding protective factors that can be augmented through training could help veterans learn to cope with the stressful experiences endured during their military service and may help preemptively to prepare sol-

diers for the stressors they may face during future deployments. The present article investigates psychological hardiness, a trainable resilience resource, that leads those in stressful occupations to cognitively appraise stressors more positively, thereby negating some of the detrimental health effects of stress (Bartone, 2006; Bartone & Hystad, 2010; Maddi, 2007).

The U. S. Army currently uses a program called Comprehensive Soldier Fitness to develop “psychological resilience within five dimensions: physical, social, emotional, spiritual, and family” (Casey, 2011, p. 1). The program combines principles of positive psychology and cognitive-behavioral therapy, with particular emphasis on optimism, problem solving, self-efficacy, self-regulation, emotional awareness, flexibility, empathy, and strong relationships (Reivich, Seligman, & McBride, 2011). A soldier’s particular training is tailored according to his or her multidimensional score on the Global Assessment Tool (Peterson, Park, & Castro, 2011). This self-report questionnaire measures an individual’s psychological fitness in the domains of emotional, social, family and spiritual fitness. Although closely tied to the principles of Positive Psychology and used in a civilian resiliency program, the predictive value of the

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Global Assessment Tool on psychological resilience has not been well established in a military population. It would be desirable to incorporate other measures that have established beneficial relationships with military stressors, such as measures of psychological hardiness.

Psychological hardiness was first described by Kobasa (1979) as a personality variable that distinguished those who became ill under stress from those who remained healthy. Her initial study identified three facets of hardiness: commitment, control, and challenge. High-hardy individuals have a strong awareness of and *commitment* to their values, goals, and capabilities, a greater sense that they *control* what occurs in their lives, and a perception of stressors as *challenges* that will make them stronger. Although many factors can influence resilient responding to stress, including organizational and contextual ones (e.g., social support), hardiness and its facets are seen as the core individual-level qualities that affect resilience (Bartone, Barry, & Armstrong, 2009; Maddi, 2007). Thus, recent research has described individuals high in hardiness as “stress resistant, committed to what they are doing, confident that they can influence their surroundings and outcomes, and able to regard major life events and transformations as challenges to be mastered rather than threats to be . . . endured” (Mikulincer & Shaver, 2007, p. 460). Hardy individuals report better physical health (Bartone, Ursano, Wright, & Ingraham, 1989) and mental health outcomes (Bartone, 1999; Pietrzak et al., 2009). Thus, hardiness is sometimes referred to as “dispositional resilience” (Bartone, 2006, 2007), reflecting a generalized tendency to display resilient responses to a range of stressors.

Nonetheless, Luthans, Avolio, Avey, and Norman (2007) have proposed that “psychological capital” factors of resilience, optimism, hope, and self-efficacy are not purely traits, but are also “state-like—relatively malleable and open to development” (p. 544). Thus, these factors may be somewhat amenable to influence through leadership and training in organizations. From this perspective, hardiness likewise is also state-like, showing moderate continuity across time and context while also being open to change, based upon experience and training (Bartone & Hystad, 2010).

Hardiness has been shown to be negatively related to posttraumatic stress in the military. In

studies of Vietnam veterans, those who scored high on hardiness were less likely to report posttraumatic stress disorder (PTSD) symptoms (King, King, Fairbank, Keane, & Adams, 1998), and this relationship was mediated by postwar social support, suggesting that hardy individuals have a better support network and are more able to seek out help in times of stress. More recently, Pietrzak and colleagues (2009) extended this work to veterans returning from Operations Enduring Freedom and Iraqi Freedom. Those with higher hardiness scores reported fewer symptoms of depression and PTSD. Hardiness has also been found to be a predictor of success in difficult military training (Bartone, Roland, Picano, & Williams, 2008; Westman, 1990) and in a rigorous selection program for Norwegian military officers (Hystad, Eid, Laberg, & Bartone, 2011).

The protective benefits of hardiness may be particularly noticeable in dispelling the effects of military-related stressors on psychological health outcomes. For example, Bartone (1999) found that hardiness moderated the effects of combat exposure on subsequent psychological well-being in U.S. Gulf War veterans. Those low in hardiness reported more psychiatric symptoms than those who scored high on this scale, and this difference was greater under high combat stress exposure. Although it is well established that posttraumatic stress symptoms increase with combat exposure (Hoge et al., 2004) and number of deployments (Reger, Gahm, Swanson, & Duma, 2009), the relationship between time in the military and posttraumatic stress is largely unexplored. Most military mental health research uses length of military service as a demographic variable to ensure that groups do not differ significantly (Lapierre, Schwegler, & LaBauve, 2007). However, increasing time in the military is likely associated with increased stress in home life, due to more frequent moves, family separation, and exposure to drugs and alcohol, and increased exposure to traumatic events, such as the death of service member colleagues and combat experiences. Extensive military experience may play a larger role in the development of posttraumatic stress than previously believed, and finding moderators of this relationship, such as hardiness, would be beneficial in helping to protect soldiers who dedicate themselves to extensive military service.

The goal of the current study is to examine the effects of time in the military on posttraumatic stress in postdeployment U.S. military personnel and the potential moderation of this relationship by psychological hardiness. It is hypothesized that time in the military, number of deployments, and time spent on deployment will be positively related to posttraumatic stress and that hardiness will moderate these relationships.

Method

Data for this study were collected from military personnel recruited at various locations and dates on Fort Sam Houston and Lackland Air Force Base as part of a quantitative, cross-sectional study looking at attachment, temperament, and hardiness as protective factors for posttraumatic stress.

Participants

In order to participate in this study, participants must have been deployed for at least 30 days or more during their military career, be age 18 years or older, and currently be on active duty. Of the 561 total respondents, 72% were male and 28% were female. The ages of the respondents were 25 years and younger (8%), 26 to 30 (23%), 31 to 40 (49%), and 41 years and older (21%). Sixty-nine percent of participants reported being married or living with a partner. Forty-four percent of the sample reported having had some college, 30% had a bachelor's degree, and 22% had a master's degree or higher. Sixty-five percent of participants were enlisted and the remaining 35% were officers. Sixty-two percent of the sample was in the Army, with another 37% from the Air Force, 1% from the Navy, and 1% from the Coast Guard. The self-reported racial identity was 66% White, 20% African American, 6% Asian/Pacific Islander, and 8% other. All participants had deployed at least once, with an average of 1 year, 10.8 months ($SD = 1.47$) total time spent on deployment.

Measures

Hardiness. The Dispositional Resiliency Scale-15 (DRS-15; Bartone, 2007) contains 15 statements that address the three hardiness sub-components of commitment, control, and chal-

lenge. Participants rated, on a 4-point scale (*not at all true* to *completely true*), statements such as, "I feel that my life is somewhat empty of meaning" (commitment), "How things go in my life depends on my own actions" (control), and "I enjoy the challenge when I have to do more than one thing at a time" (challenge). All analyses used the sum score for the 15 items. Cronbach's alpha coefficient was .78 for the full 15-item measure.

Posttraumatic stress symptoms. Self-reported posttraumatic stress symptoms were measured using the PTSD Checklist, Military Version (PCL-M; Weathers, Litz, Herman, Huska, & Keane, 1993). Respondents rated on a 5-point scale (1 = *not at all* to 5 = *extremely*) how much "you have been bothered by that problem in the past month." All analyses used the sum score from the PCL-M. Cronbach's alpha coefficient was .96 for the 17-item scale.

Procedure

Anonymous questionnaires were distributed to military personnel on Fort Sam Houston and Lackland Air Force Base in San Antonio, Texas, from summer 2010 to summer 2011. Volunteers were recruited in a variety of settings such as classrooms, outside the post exchange, or in hallways, in which there was one box with blank questionnaires with envelopes and a separate box for returning the completed questionnaire in the sealed envelope. The study was reviewed by the Brooke Army Medical Center's Institutional Review Board and received an exempt research status based on the entirely anonymous nature of the questionnaires.

Results

Hardiness scores were negatively correlated with PTSD scores, whereas Time in the military was positively related to PTSD. Table 1 contains the correlations, means, and standard deviations of all variables. The mean hardiness score for the sample was 28.69 ($SD = 6.16$) and the mean PTSD score was 30.07 ($SD = 14.35$). Using a cutoff score of 50 on the PCL-M (Terhakopian, Sinaii, Engel, Schnurr, & Hoge, 2008), 13% of the sample screened positive for probable PTSD. The mean hardiness score of those with probable PTSD, $n = 70$, $M = 24.17$,

Table 1
Correlations, Means, and Standard Deviations of Key Variables (N = 542)

	2	3	4	5	M	SD
1. Hardiness	-.14*	-.14*	-.11*	-.39**	28.69	6.16
2. Time in military (years)		.31**	.32**	.17*	12.89	6.27
3. Number of deployments			.59**	.23**	3.03	2.30
4. Time deployed				.21**	1.90	1.47
5. PTSD					30.21	14.33

Note. PTSD = posttraumatic stress disorder.

* $p < .01$. ** $p < .001$.

$SD = 5.88$, was significantly lower than those without PTSD, $n = 477$, $M = 29.35$, $SD = 5.94$; $t(545) = -6.82$, $p < .001$.

It was predicted that time in the military would be positively related to PTSD symptoms and that this relationship would depend on hardiness. To test this, PTSD scores were regressed on hardiness scores, time in the military, and the product of Hardiness \times Time in the military as predictors. The continuous variables hardiness and time in the military were centered prior to calculating the interaction term (Keith, 2006).

In Step 1, time in the military and hardiness were both significant predictors of PTSD, $\beta = .12$, $t(539) = 3.00$, $p = .003$ (time in the military) and $\beta = -3.80$, $t(539) = -9.56$, $p < .001$ (hardiness). Those with longer military service tended to report higher scores on the PTSD Symptoms Scale, and those with higher hardiness scores tended to report lower scores on the PTSD Symptoms Scale.

A significant Hardiness \times Time in military interaction was found for PTSD scores,

$t(538) = -2.29$, $p = .022$. To investigate this interaction in more detail, three additional multiple regressions were performed using three levels of the independent variable hardiness: the mean, one standard deviation below the mean (low values), and one standard deviation above the mean (high values; Cohen, Cohen, West, & Aiken, 2003). Figure 1 portrays the significant interaction between time in the military and hardiness in predicting PTSD symptoms. A significant positive relationship between time in the military and PTSD symptoms was found for low values of hardiness, $\beta = .20$, ($B = .46$, $SE = .12$) $t(538) = 3.77$, $p < .001$, and for mean values of hardiness, $\beta = .12$, ($B = .27$, $SE = .09$) $t(538) = 2.96$, $p = .003$, but the slope for high values of hardiness was not significantly different from zero, $\beta = .03$, ($B = .07$, $SE = .13$) $t(538) = .56$, $p = .579$. For those who scored at or below the mean on hardiness, years of military service positively predicted PTSD scores. For those who scored above the

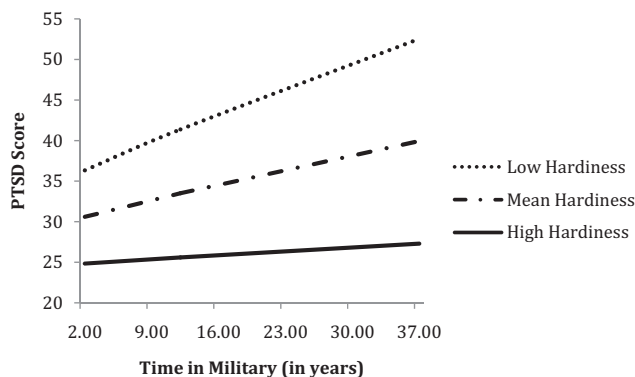


Figure 1. The relationship between time in the military and PTSD depends on hardiness ($N = 452$).

mean on hardiness, time in the military did not predict PTSD scores.

Similar moderation analyses were performed using as predictor variables, hardiness with number of deployments, and hardiness with time spent on deployment. Number of deployments was a significant predictor of PTSD symptoms, $\beta = .18$, $t(541) = 4.66$, $p < .001$; however, the interaction between hardiness and number of deployments was not significant, $\beta = .01$, $t(540) = .33$, $p = .744$. Similarly, time spent on deployment significantly predicted PTSD symptoms, $\beta = .17$, $t(541) = 4.23$, $p < .001$; however, the interaction between hardiness and time spent on deployment was not significant, $\beta = -.07$, $t(540) = -1.14$, $p = .253$. Therefore, these variables predicted similarly and significantly for all levels of hardiness.

Discussion

The results suggest that hardiness (dispositional resilience) may be a protective factor for those with extensive military experience. In this sample, susceptibility to PTSD increased with time in the military; however, this occurred only for those with average or below average hardiness scores. The stress of long-term military service may increase the likelihood that those low in hardiness will develop posttraumatic stress, whereas those with higher hardiness levels will be relatively unaffected by the additive stress of long-term military service. Hardiness was not a significant modifier of the relationships of PTSD with number of deployments or time spent on deployment. Even for those high in hardiness, the experience of multiple deployments or extended time on deployment was associated with elevated symptoms of PTSD.

Time in the military is a broad construct that may encompass several military-related stressors, such as number of deployments, combat experience, and exposure to death or serious injury of military colleagues and nonmilitary stressors, such as moving, family problems, and exposure to drugs and alcohol. This is the first study to find time in the military to be a significant predictor of PTSD. Although it is important to acknowledge that extensive military service may play a role in the development of PTSD, it is equally informative to note that hardiness, a psychological resource that is trainable (Bartone & Hystad, 2010), may protect

some at-risk career military members from developing PTSD. It is surprising that the interactions of hardiness with each of the deployment variables were not significant. A possible methodological explanation for this is that time in the military is a better measure psychometrically, as it has a greater range and more variability than either of the deployment variables. Alternatively, a theoretical explanation for these nonsignificant findings is that the stressful effects of combat deployment were too strong to be moderated by hardiness in this sample. Previous studies (Pietrzak et al., 2009) reported that hardiness protects against symptoms of PTSD, over and above the significant detrimental contribution of combat exposure on PTSD. The nonsignificant interactions of hardiness with deployment variables in the present study suggest that hardiness may not play as strong of a role in protecting against the development of PTSD after combat exposure, as previously suggested. The effects of stressful deployment experiences may overwhelm the otherwise beneficial impact of hardiness.

These findings may be beneficial for informing the content and the screening process of the military's current resilience training programs. The results of this study suggest that psychological hardiness may have significant protective value against the stress of time in the military. Encouraging soldiers to have a strong awareness of and *commitment* to their values, goals, and capabilities, a greater sense that they *control* what occurs in their lives, and a perception of stressors as *challenges* that will make them stronger may help them avoid some of the negative psychological symptoms that emerge after many years in the military. These results are also important for the development of screening tools such as the Global Assessment Tool (Peterson et al., 2011), which is used to identify the psychological fitness of individual soldiers and to tailor their resilience training accordingly. Bonanno, Westphal, and Mancini (2011) criticized the empirical basis of the military's current resilience training programs. For example, they cautioned that such training programs may be detrimental to those individuals who would have otherwise been unaffected by military stressors. The results of this study suggest that those high in hardiness may be resilient to the effects of PTSD, even after many years in the military, but may benefit from resiliency

training when faced with multiple deployments, in which case even high hardiness may not be enough to ensure their resilience. Incorporating a measure that has an established beneficial relationship with PTSD, such as hardiness, may help to separate those service members who would benefit from the training from those who do not.

There are several limitations of this study. First, recent media focus on PTSD has made soldiers very aware of the symptoms that it entails. Familiarity with the screening measures and the stigma associated with negative implications of scoring highly on a PTSD scale might cause them to underreport their symptoms of posttraumatic stress (Southwick et al., 1993). Second, these results may not be generalizable to all postdeployment military members. The opportunistic recruitment strategy used in this study yielded a sample that was older and better educated than the military population as a whole.

A third limitation was the cross-sectional nature of this study. Participants answered questions regarding posttraumatic stress and hardiness at the same time, which may artificially inflate correlations. Indeed, all stressor variables were negatively correlated with hardiness, suggesting that more deployments, more time spent on deployment, more time in the military, and more symptoms of PTSD may have contributed to lower hardiness. Similarly, Vogt, Rizvi, Shipherd, & Resick (2008) found that reports of problems with potential stressors during a stressful military training were associated with decreases in later hardiness. Longitudinal and experimental data are necessary to better understand how hardiness might change over time and what factors may affect its trajectory, as well as to make stronger statements about how hardiness might impact the development of PTSD (Lambert & Lambert, 1999).

A fourth limitation, which may have artifactually increased the correlation between hardiness and PTSD, is the overlap between items used to measure hardiness and PTSD. For example, the underlying emotional state reflected by the statement from the hardiness scale, "I feel that my life is somewhat empty of meaning," could also be reflected in the statement from the PTSD scale, "Feeling as if your future somehow will be cut short." This problem is somewhat negated by the associations of both of

these subjective scales with more objective measures. The PCL-M, for example, has been found to be significantly correlated with the more objective Clinician Administered PTSD Scale (Blanchard, Jones-Alexander, Buckley, & Forneris, 1996) and to physical functioning in physically injured hospital patients (Zatzick et al., 2013). Similarly, hardiness was associated with a measure of physical health that included number of sick-call visits (Bartone et al., 1989).

Understanding the stability of hardiness over time and experience is necessary in order to make stronger claims about its beneficial impact. Future research should also address other factors that may be involved in this relationship, such as combat exposure (Bartone, 1999; Pietrzak et al., 2009) and social support (King et al., 1998). For example, Pietrzak et al. (2009) found that combat experiences were positively related to PTSD symptoms and that resilience and social support were protective factors after controlling for combat experiences. Including these variables would explain more of the variance in PTSD and may provide a better model of the data.

In conclusion, this study is the first to highlight the protection that hardiness provides against the development of PTSD symptoms in persons with extensive military experience. Resiliency training programs may benefit from including hardiness measures to screen and train military personnel. Soldiers will likely benefit from being encouraged to see the positive benefits that their deployment will have on their personal and professional lives, as well as their country.

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